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Mine Safety and Health Administration

Metal and Nonmetallic Mine Safety Standards and Health

DEPARTMENT OF LABOR

Mine Safety and Health Administration

30 CFR Parts 55, 56, and 57

New and Revised Safety and Health Standards for Radiation (Radon Daughter Exposure); Fire Protection and Control; Ventilation, Loading, Hauling and Dumping; Travelways and Escapeways; Hoisting; and Sanitary Facilities

AGENCY: Mine Safety and Health Administration, Department of Labor.

ACTION: Final rule.

SUMMARY: This final rule amends 30 CFR parts 55, 56 and 57 by revising certain mandatory standards, adding a new definition and new mandatory standards, and revising certain advisory standards and making them mandatory. This rule promulgates mandatory standards affecting radon daughter exposure, fire protection when welding or cutting with an arc or open flame or soldering with an open flame, operation of fans in gassy and nongassy mines, ventilation plans, preshift inspection of self-propelled equipment, loading of haulage equipment, warning devices and conspicuous markings, independent ventilation systems for hoist operators underground, stabilizing buckets, sanitary facilities, and a definition for multipurpose dry-chemical fire extinguishers. This rule will afford miners additional protection from accidents, injuries, and occupational diseases in metal and nonmetal mines and mills.

EFFECTIVE DATE: These standards shall be effective August 30, 1979, except for the standard 57.11–59 pertaining to independent ventilation systems for hoist operators underground which shall be effective November 28, 1979.

FOR FURTHER INFORMATION CONTACT: Thomas J. Shepich, Administrator, Metal and Nonmetal Mine Safety and Health, Mine Safety and Health Administration, Ballston Tower #3, Room 702, 4015 Wilson Boulevard, Arlington, Virginia 22203, (703) 235–1565.

SUPPLEMENTARY INFORMATION:

Regulatory History

When the Federal Mine Safety and Health Admendments Act of 1977 (the Amendments Act), Pub. L. 95–164, became effective on March 9, 1978, the Federal Metal and Nonmetallic Mine Safety Act of 1966 (the Metal Act), Pub. L. 89–577, was repealed. However, certain formal rulemaking proceedings relating to health and safety standards were pending before the Secretary of the Interior and the Mining Enforcement and Safety Administration (MESA) at that time. Pursuant to section 301(c)(3) of the Amendments Act these rulemaking proceedings were transferred to, and continued before, the Secretary of Labor and the Mine Safety and Health Administration (MSHA). This final decision and rule are the results of a formal rulemaking proceeding initiated by the Secretary of Interior and MESA under Section 6 of the Metal Act.

On September 25, 1975, a notice of proposed rulemaking setting forth proposed amendments to Parts 55, 56 and 57, of Title 30, Code of Federal Regulations, was published in the **Federal Register** [40 FR 44272]. The original comment period was extended from November 6, 1975 to December 5, 1975 [40 FR 51202] to encourage full public participation. A number of interested persons and organizations filed written comments, suggestions and objections with respect to most of the proposed standards and several objections contained specific requests for public hearings. The objections and the proposed standards, several of which were revised to reflect public comments, were published in the **Federal Register** on June 16, 1977 [42 FR 30772]. In the same publication, the Secretary of the Interior, under the authority of section 6(d)(1)(2) of the Metal Act, instructed that a public hearing be held before an Administrative Law Judge, who would be empowered to receive evidence relevant and material to the issues raised by the objections set forth in the **Federal Register.** The Administrative Law Judge was further authorized to consider all objections, and based upon the record, submit a recommended decision to the Secretary who would review the recommendations and issue a final decision.

The formal public hearing, subject to the provisions of the Administrative Procedure Act [5 USC 556 and 557], was held in Albuquerque, New Mexico from August 22, 1977 through August 26, 1977 and was reconvened on October 3, 1977 through October 5, 1977 in Lakewood, Colorado.

During the public hearing phase of the rulemaking, many of the proposed standards were stipulated either without change or with modification by the unanimous consent of the participating parties. When the major participating parties reached agreement on the wording of certain standards, the agreed language was read before George A. Koutras, presiding Administrative Law Judge. If no objection was raised by any party, the stipulated provision was made part of the record without further testimony. There was general agreement or a stipulation to the following standards: 57.4–76 (fire extinguishers), 57.4–77 (fire protection near combustibles), 57.4–78 (fire protection in shafts, raises or winzes), 57.5–18B (combustibles within 25 feet of main and booster fans), 57.5–20 (ventilation system plans), 57.5–37 (radon daughter recordkeeping and reporting), 57.9–104 (warning devices), 57.11–59 (independent ventilation systems), 55/56/57.19–78 (hoisting buckets), 55/56/57.20–8 (sanitary facilities), 57.21–21 (gassy mines-continuous operation of main fans), 57.21–24 (gassy mines-fan stoppage), and 57.21–80 (gassy mines-methane monitoring devices).[1] However, proposed standards 57.5–18D (continuous operation of main and booster fans), 57.5–24 (airway separation), and 57.5–34 (continuous operation of auxiliary fans) were contested.

The Administrative Law Judge recommended that proposed standard 57.5–24, concerning physical separation of intake and exhaust airways, not be adopted and that an in-depth study be undertaken by the agency before any such standard is issued in the future. In addition, MESA agreed to withdraw proposed standards 55/56/57.4–36, relating to fire protection when welding or cutting with an arc or open flame or soldering with an open flame.

Also during the hearing, the agency agreed to place the wetting down and fire patrol requirements, which had been contained in proposed standard 57.4–65, directly into standards 57.4–77 and 57.4–78. Consequently, the proposal to revise mandatory standard 57.4–65 has been withdrawn and the standard is revoked in this final rule.

By agreement of those present at the conclusion of the hearing, the date for closing the record and filing post-hearing arguments was fixed as December 19, 1977.

After consideration of the entire public record, the Administrative Law Judge submitted his recommended decision to the Secretary of the Interior on February 10, 1978. An order correcting the recommended decision was issued on March 13, 1978. Copies of these documents were sent by the Administrative Law Judge to all interested parties.

In this rulemaking proceeding, the Secretary adopts the recommended

[1] Standards uniformly applicable to 30 CFR Parts 55, 56 and 57 are referred to in this document as 55/56/57.

decision of Administrative Law Judge Koutras dated February 10, 1978 (as corrected) as his decision.[2] Based on the recommendations of the Administrative Law Judge, MSHA is withdrawing the following proposed standards: 55/56/57.4–36, 57.5–24, and 57.4–65.

In adopting the recommended decision of Judge Koutras, certain editorial changes have been made in final standards 57.5–18D(a) (continuous operation of main and booster fans), 57.5–37(a) (radon daughter sampling), 57.5–40(b)(1), (2), (3), (4), and (6) (radon daughter recordkeeping and reporting), 55/56/57.9–1 (safety defects), 57.21–21(d) (gassy mines-continuous operation of main fans), and 57.21–80 (gassy mines-methane monitoring devices). The reference to paragraph 9.8 ANSI N13.8–1973 in standard 57.5–40(b) has been completed under the provisions of 1 CFR Part 51 issued by the Office of the Federal Register.[3]

In addition, an editorial change has been made in the "Note" to standard 57.5–40 (calculating radon daughter exposure). This change is considered necessary to more fully clarify the intent expressed by the parties in the stipulated wording. The agency has proceeded without objection, after having notified the major participating parties in the rulemaking and given them the opportunity to respond.

Also included in the September 25, 1975, notice of proposed rulemaking but not considered by the Administrative Law Judge were proposals to add a new mandatory standard 57.4–79, relating to equipping electrically powered vehicles with at least one "portable fire extinguisher," and to revise mandatory standard 57.21–20, concerning the installation of main fans used in gassy mines (40 FR 44280 and 44284, respectively). Standard 57.4–79 was closely related to the definition of the term "portable fire extinguisher" considered by Judge Koutras, and standard 57.21–20 was a companion to gassy mine standards 57.21–21, 57.21–24, and 57.21–80, also considered by the Judge.

However, no hearing was requested on standard 57.4–79, and standard 57.21–20 had been recommended by the Federal Metal and Nonmetal Mine Safety Advisory Committee (and therefore was not subject to public hearings). Rather than promulgate these proposals as final standards on an earlier date, the Secretary of the Interior elected to delay issuance until a final decision had been made on the proposals subject to hearing. Therefore, revised mandatory standard 57.21–20 is now promulgated by the Secretary of Labor as a final standard. The proposal to add a new mandatory standard 57.4–79 is withdrawn. Electrically powered vehicles are considered to be self-propelled mobile equipment, which will be required to have a suitable fire extinguisher readily accessible to the equipment operator under new mandatory standard 55/56/57.4–27, to be promulgated separately under rulemaking authorized by section 301(b)(2) of the Amendments Act.

Copies of the recommended decision are available to the public and may be obtained by contacting the Office of Standards, Regulations and Variances, Department of Labor, Room 631,

[2] The Amendments Act was enacted on November 9, 1977, three months prior to the issuance of the recommended decision by the Administrative Law Judge. Although section 301(c)(3) of the Amendments Act authorized the Secretary of Labor to continue rulemaking begun by the Secretary of the Interior, section 301(b)(2) of the Amendments Act also required the Secretary of Labor to establish within 60 days from enactment an advisory committee to review all existing safety and health standards promulgated as advisory under the Metal Act. In executing this responsibility, on January 5, 1978, the Secretary appointed the membership of the "Advisory Committee to Review Advisory Metal and Nonmetallic Mine Safety Standards" (the Advisory Committee) to recommend which of those standards should be upgraded or modified as new mandatory standards. Among the advisory standards considered by the Advisory Committee were certain of those standards which were also pending before the Administrative Law Judge in these proceedings: 55/56/57.9–1 (safety defects), 55/56/57.9–34 (haulage equipment), 55/56/57.9–104 (warning devices), 55/56/57.19–78 (hoisting buckets), 55/56/57.20–8 (sanitary facilities), and 57.21–21 (gassy mines-continuous operation of main fans). After extensive deliberation involving public meetings and participation, the Advisory Committee submitted its recommendations to the Secretary on July 5, 1978. The recommendations of the Advisory Committee were virtually identical to the recommendations of the Administrative Law Judge.

The recommendations of the Advisory Committee were then published as a proposed rule by MSHA on September 12, 1978 (43 FR 40766). Comments on this proposal, including those relating to advisory standards considered by the Administrative Law Judge, were submitted to MSHA by interested parties. While the deliberations of the Advisory Committee and the related public participation were not formally a part of the rulemaking proceedings before the Administrative Law Judge, the agency did take notice of the similarity between the Advisory Committee's recommendations and the Judge's recommended decision, and the absence of any new issues of significance or of other information which would have caused a modification of any standard being adopted here as a final rule.

Concern was expressed in public comments regarding the burden of recordkeeping and its possible legal consequence in standards 57.5–20 (ventilation system plans), 57.5–40 (radon daughter recordkeeping and reporting), 55/56/57.9–1 (safety defects) and 57.21–21 (gassy mines-continuous operation of main fans). MSHA has concluded that the risks associated with radiation, airborne contaminants, and other high hazard situations unique to the mining environment justify the recordkeeping requirements without imposing undue administrative burdens or significantly increasing legal jeopardy to the operator. The agency believes that by promoting a better awareness of important safety and health considerations, these requirements will result in increased safety and health protection for miners.

[3] On March 28, 1979, 44 FR 18630 (corrected April 2, 1979, 44 FR 19181), the Office of the Federal Register amended its regulations (1 CFR 51.13) concerning approval of incorporation by reference in the Code of Federal Regulations. Approvals for such incorporations by reference appearing in Title 30, CFR Parts 55, 56 and 57 are withdrawn effective July 1, 1980. Prior to this date, MSHA intends to appropriately revise its regulations.

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Radiation (Radon Daughters)

57.5–37. This standard is applicable to underground mines only. Radon daughters produced by the radioactive decay of radon have been linked to a high incidence of lung cancer in uranium miners. Uranium miners receive internal radiation exposure from inhaling radon, radon daughters, and uranium ore dust. The presence of radon daughters is not limited to uranium mines because radium bearing rock is often encountered during the mining process in other types of operations. Therefore, many miners are exposed externally to beta and gamma radiation which is emitted from uranium and radium bearing rock; radon and radon daughters constitute the dominant exposure. Since these hazards may be present in many underground mines, and appropriate program of monitoring and surveillance is essential. These rules will significantly strengthen MSHA's previous sampling requirements.

Since radon daughters are more prevalent in uranium mines, the sampling requirement is more stringent in those mines than in mines where uranium is not mined. The requirement also becomes more stringent as the radon daughter concentration in the worker's breathing zone increases. Sampling is essential to keep the mine operator apprised of the potentially hazardous atmosphere present in the mine. This will permit the operator to take preventive measures to minimize the danger to the miner.

Standard 57.5–37 establishes the procedure to be used by the mine operator in sampling mine exhaust air for the presence of radon daughters. This standard requires the operator to use the equipment and procedures described in §14.3 of ANSI N13.9–1973 (incorporated by reference) or equivalent procedures and equipment acceptable to the Administrator, Metal and Nonmetal Mine Safety and Health, MSHA. The sampling is to be done by a competent person as defined in 30 CFR 57.2.

Because of the potentially harmful effects of radiation, all mines must be sampled whether or not uranium is known to be present in the mine. If exhaust air samples reveal a concentration of radon daughters in excess of 0.1 WL ("Working Level" as defined in section 57.2), the radon daughter concentrations representative of the worker's breathing zone must be determined for all workers underground. In uranium mines this determination must be made very two weeks at random times in all active working areas in any other location where persons work, travel, or congregrate. Where uranium is not mined, the concentration of radon daughters in the worker's breathing zone in the active working area must be determined every three months at random times until such concentrations are below 0.1 WL and annually thereafter.

Where uranium is mined, if the radon daughter concentration in the exhaust air is less than 0.1 WL, the exhaust air must still be sampled every 2 weeks. However, no further exhaust air sampling is required where uranium is not mined, if the radon daughter concentration in the exhaust air is less than 0.1 WL.

In the event that exhaust air samplings reveal a radon daughter concentration in excess of 0.3 WL in the active working area, concentrations must be determined weekly in that area (whether or not uranium is mined) until the weekly determinations are 0.3 WL or less for five consecutive weeks.

This final rule contains a separate procedure for testing when the radon daughter concentration rises above 0.3 WL in the exhaust air. The proposed standard contained no such provision. In addition, this final rule requires exhaust air testing in a uranium mine every two weeks when the radon daughter concentration is between 0.1 WL and 0.3 WL. The proposed standard specified monthly testing under like circumstances. The agency and parties stipulated to the language of the final rule.

The mine operator is required to keep a record of all mandatory samplings. This record is to include the sample date, location and results, and must be retained at the mine site or nearest mine office for two years. The report must be made available for inspection by the Secretary of Labor or his authorized representative.

The reporting requirement will alert the mine operator and MSHA of possible failure in the radon daughter control system, and permit appropriate corrective action to be taken in a timely manner. This requirement also will aid MSHA in enforcing the radiation standard and insuring that the mine operator is continually aware of the miner's individual exposure to concentrations of radon daughters.

Commenters urged that the agency perform the initial sampling because more extensive training is required for a person to perform this type of sampling than is required for routine mine atmosphere sampling. The mine operator could then assume sampling responsibility for mandatory samples in instances where the initial exhaust air sample is above the levels indicated in the standard. In response to this suggestion, the final rule provides an opportunity for the mine operator to request that the initial exhaust air sampling be done by MSHA.

Another objection to the proposal questioned the need for tracking levels of radon daughter concentrations so low that constant exposure by the miner would result in less than the annual 4 WLM limit ("Working Level Months" as defined in section 57.2). MSHA believes that it is necessary to begin monitoring at low levels in order that any increase in radon daughter concentrations to more serious levels does not go undetected. Once radon daughters, even at low levels, are present in the mine atmosphere, there is a significant potential danger of those levels increasing. In addition, MSHA is very concerned about the impact which low level radiation exposure may have on the miner's health over the long term and it is necessary for records of all such exposures to be kept and maintained in order to more fully assess those effects over time.

57.5–40. Standard 57.5–40, which is applicable to underground mines only, requires the mine operator to calculate, record and report individual exposures to concentrations of radon daughters. This standard also is more stringent where uranium is mined than where other substances are mined.

Where uranium is mined, the mine operator must calculate, record and report the individual exposures to radon daughters of all mine personnel working underground. These records must include: (1) the individual's time in each active working area and any other place where persons work, travel, or congregate; and (2) the concentration of airborne radon daughters for each active working area.

Where uranium is not mined, the operator need only calculate, record and report the individual exposure of those mine personnel working in active working areas with radon daughter concentrations in excess of 0.3 WL. These records also must include the individual's time in each active working area and the concentrations of radon daughters for each active working area. The calculating and recording of such individual exposures may generally be discontinued on individuals in those areas when the radon daughter concentrations have been reduced to 0.3 WL or less for five consecutive weeks. However, exposure records must be

continued for all persons who have accumulated an exposure at any time during a calendar year which, when divided by the number of months exposed during that year, is greater than 0.8 WLM (e.g., January—.08; February—.17; March—.25; etc.).

The standard as originally proposed would have required the mine operator to sample weekly the breathing zones of persons in areas where they work, travel, or congregate. The proposed weekly sampling requirement was objected to on the ground that monthly testing should be sufficient in areas of uranium mines that have consistent readings of 0.3 WL or less. This suggestion is reflected in the final rule, which limits weekly sampling requirements to working areas in which the fluctuation in radiation is substantial or concentrations of radon daughters exceed 0.3 WL, and is consistent with the sampling requirements of rule 57.5–37. The revised rule was stipulated by the parties at the hearing.

Standard 57.5–40(b) contains certain reporting provisions needed for enforcement. It also provides both the mine operator and miner with exposure data relevant to the miner's health, and other information relevant to the miner's working environment.

Records of individual exposures to radon daughters must be maintained by the operator and be open to inspection by the Secretary of Labor or other authorized representatives. A record of individual exposures (new Form 4000–9) must be submitted to MSHA on or before February 15 of each calendar year, unless the mine has been shut down, in which event it should be submitted within 45 days after the shut-down of mining operations for the calendar year. The operator must either retain these records at the mine or nearest mine office until the year in which the individual would have reached the age of seventy-five or until ten years after the known death of the individual [9.8, ANSI N13.8–1973]. In the alternative, records may be submitted to MSHA for retention. If retained by the operator, the records must be open for examination by the Secretary of Labor or his authorized representative, and the authorized representative of the mine inspection agency of the State in which the mine is located. The individual who is the subject of these records (or his or her designee) may request and obtain a statement of current year-to-date and cumulative exposure.

The reporting provision as originally proposed would have required the completion of two forms. It also would have required the mine operator to submit records within 14 days after the end of each four week reporting period. However, MSHA believes an annual report will afford meaningful protection since these records are open for examination and review by the Secretary or his authorized representative. In addition, the 14 day requirement for submission of records after the reporting period has been lengthened to 45 days to allow the operator ample time to collect data, process it and correct any errors. The agency has also concluded that one form, "Record of Individual Exposure to Radon Daughters," (Form 4000–9) is adequate for enforcement purposes, and the proposed requirement for an additional form was deleted. These revisions will minimize the paperwork to be completed by the operator and encourage more accurate reporting on Form 4000–9.

In the proposed rule, all measurements of radon daughter concentration data previously reported to the operator by authorized State and Federal representatives were to be included on these forms. This proposed requirement is no longer required because the separate form has been eliminated. If the mine operator takes samples simultaneously with a State or Federal inspector, the operator may use his own samples in calculating individual exposures. However, the State and Federal samples must be recorded and the records made available to the Secretary or his authorized representative. In addition, the proposed reporting provisions for mines located in a State with a State plan approved by the Secretary of the Interior have also been deleted since the State plans program was eliminated with the repeal of the Metal Act.

MSHA believes that final standards 57.5–37 and 57.5–40 together will provide adequate sampling and recording which will alert mine operators, miners, and MSHA to potential radiation hazards and will afford a significant added measure of protection to miners who may be exposed to such hazards.

Fire Prevention and Control

Multipurpose dry-chemical fire extinguisher. This new term is added to the definitions set forth in sections 55.2, 56.2 and 57.2. The definition requires that a listed or approved multi-purpose dry-chemical fire extinguisher have a minimum rating of 2–A:10–B:C by the Underwriters Laboratories, Inc. and contain a minimum of 4.5 pounds of dry-chemical agent. This definition is a modification of the proposed term "portable fire extinguisher" in response to public comment.

Another objection to the originally proposed definition contended it would restrict all portable fire extinguishers to multi-purpose dry-chemical extinguishers. Consideration of this comment resulted in the modification of mandatory standards 57.4–77 and 57.4–78, which specifically permit the use of fire extinguishing equipment having the equivalent extinguishing capacity appropriate for the particular hazard. In addition, these mandatory standards require the mine operator to initiate other extra-precautionary measures when working conditions and the degree of potential hazard warrants. The mandatory standards are minimum requirements and do not prohibit the mine operator from using additional safeguards and equipment.

All parties stipulated to the modified definition of the multi-purpose dry-chemical extinguisher.

57.4–76, 57.4–77 and *57.4–78.* New mandatory standards 57.4–76, 57.4–77 and 57.4–78 have been added to require mine operators of underground mines to take specific precautions in certain situations that pose a high risk of fires. The effect of the new standards is to increase the number of required precautions as the potential for underground fires increases. The language of these standards was stipulated by the parties.

The minimum requirement is that a mine operator provide a multi-purpose dry-chemical fire extinguisher where there is welding or cutting with an arc or open flame, or when miners are thawing pipes electrically (excluding the use of heat tape) or soldering with an open flame [57.4–76]. The mine operator must provide either a second multi-purpose dry-chemical extinguisher or equipment with the equivalent extinguishing capacity appropriate for the particular hazard involved where these same operations occur in close proximity to: (1) specific quantities of combustible liquids (other than those enclosed in noncombustible metal containers); (2) non-fire-retardant wood; (3) combustible plastic; (4) a mine shaft; and (5) a raise or winze. This additional extinguishing equipment is also required in any other instances where there is a risk that combustible materials may be ignited by falling sparks or heated material [57.4–77(a), 57.4–78(a)]. In addition, the combustible materials and the area between them and the operation must be wetted down before and after the operation when wetting down is practical. Where wetting down is not practical, the combustible materials

must be isolated by noncombustible materials or the operation must be shielded to prevent smoldering metal or sparks from starting a fire [57.4–77(b), 57.4–78(b)].

All parties agreed that cables, which meet the standards of flame resistance established in 30 CFR 18.64, and conveyor belting and hoses, which meet the standards of flame resistance established in 30 CFR 18.65, are considered by MSHA to be noncombustible under standards 57.4–77 and 57.4–78.

Furthermore, other materials which have a flame spread index of 25 or less as determined by the American Society for Testing and Materials methods of testing are considered to be noncombustible under standards 57.4–77 and 57.4–78. Where these welding, cutting, thawing or soldering operations occur within close proximity to a shaft, raise or winze and there is risk that combustible materials may be ignited by falling sparks or heated material, the mine operator is permitted an additional optional method of preventing fire. Instead of wetting down, isolating or shielding, the mine operator may cover or bulkhead the opening of the shaft, raise or winze with noncombustible material [57.4–78]. A second person must be present to observe and extinguish fires if wetting down, isolation, shielding, covering or bulkheading in the instances described is impractical [57.4–77(c), 57.4–78(b)].

An added precaution is that an inspection must be made of the affected area during the first hour after these welding, cutting, thawing or soldering operations are terminated where: (1) these operations occur in close proximity to combustible liquids, non fire-retardant wood, combustible plastic or a mine shaft, raise or winze; and (2) there is a risk of combustible material becoming ignited by falling sparks or heated material. If the mine operator considers that the working conditions and the degree of potential hazard warrant, additional inspections must be made or other precautionary measures taken [57.4–77(d), 57.4–78(e)].

Each of these new mandatory standards is based on the agency's belief that all reasonable steps must be taken by mine operators to prevent the occurence of fires. If fires do occur, sufficient and appropriate extinguishing equipment must be readily available for use. Such control measures will expose fewer miners to the hazard potential of fire, and minimize the likelihood and extent of any injuries.

57.5–18B. Mandatory standard 57.5–18B requires that areas within 25 feet of main and booster fans located on the surface and underground be kept free of all combustible materials except for installed wiring, materials used for fan maintenance, direct fired heaters, and ground support. Installed track ties are not considered combustible materials for purposes of construing this standard. This mandatory standard is an important element in fire prevention and control and in the maintenance of good air quality.

The language of the standard as originally proposed has been modified and these changes were stipulated by the parties. The proposal provided that combustible materials not be allowed to accumulate in areas surrounding main and booster fans for a distance of 100 feet except that fire-retardant material could be used for ground supports. Commenters suggested that "accumulate" was vague, and that keeping all combustible material out of areas within 100 feet of main and booster fans was unnecessary. The agency subsequently concluded that 25 feet is sufficient to protect the safety and health of miners. The final rule meets the basic purpose and intent of the standard as originally proposed, and the needs of both the miner and mine operator.

Ventilation and Air Quality

57.5–18D and *57.5–34.* Final rules 57.5–18D and 57.5–34 are designed to promote good air quality and to alert the miner and mine operator to situations which threaten that air quality. They are discussed together because they were considered as a package during the hearing. The basic issues involved are essentially the same.

Standard 57.5–18D requires all main and booster fans installed and used to ventilate active workings of underground mines to be operated continuously while persons are underground in the active workings. However, scheduled production-cycle shutdowns, planned or scheduled fan maintenance and adjustments are permitted when air quality is maintained in compliance with the applicable standards of section 57.5, and all persons underground in the affected areas are advised in advance. Standard 57.5–34 imposes a similar duty upon the mine operator when using auxiliary fans. The same exceptions are permitted in the auxiliary fan regulation for scheduled production-cycle shutdowns, fan maintenance and fan adjustments.

In the event of fan failure due to malfunction, accident, power failure, or other unplanned or unscheduled event, a competent person must test the air quality in the affected active workings for compliance with the applicable standards of section 57.5. The air quality must be tested within 2 hours of the discovery of the fan failure and every 4 hours afterwards until normal ventilation is restored [57.5–18D(b)(1), 57.5–34(b)(1)].

If the mine operator elects not to do the required air quality testing, all persons (except those working on the fan) are to be withdrawn until the ventilation is restored to normal and the air quality is tested by a competent person to assure that the air quality meets the standards of section 57.5. After the air quality standards are met, other persons may then be permitted to enter the affected active workings [57.5–18D(b)(2), 57.5–34(b)(2)].

Underground mines usually present harsh and hostile working environments. The ventilation system is the most vital life support system in underground mining and a properly operating ventilation system is essential for maintaining a safe and healthful working environment. Lack of adequate ventilation in underground mines has resulted in fatalities from asphyxiation and explosions. The deaths of many other miners resulting from radiation overexposure, silicosis and pneumoconiosis can be attributed primarily to inadequate ventilation. In addition, poor working conditions from a lack of adequate ventilation contribute to accidents as a result of heat stress, limited visibility or impaired judgment from contaminants.

Although some present day underground mines depend upon naturally induced airflow for their primary ventilation, mechanical devices may be necessary to assure air quality. Since work areas are continually being advanced beyond the main ventilation air stream, auxiliary ventilation is often necessary to supply air to dead-end working places, maintain uncontaminated environments, and to condition air in faces for temperature and humidity control.

Scheduled maintenance on main, booster or auxiliary fans usually requires that the fan be shut down. If fan repairs take longer than estimated, hazardous quantities of contaminants may be produced. The length of time required for maintenance varies from mine to mine. During this idle period, it is important to insure that the mine air in the affected workings is free of hazardous quantities of contaminants and not deficient in oxygen.

Mine accident reports reflect that a number of factors contribute to the causes of ventilation-related accidents,

including: (1) failure to provide and maintain adequate ventilation; (2) failure to test a mine area containing a possible asphyxiating atmosphere before entering; (3) failure to maintain air quality before reentering a mine after blasting when the ventilation system had been shut down (and not restarted prior to the reentry); and (4) failure to provide positive mechanical ventilation to dissipate rock strata gas upon reentry into a mine after the ventilation fan had been shut down and not restarted. Mandatory standards 57.5–18D and 57.5–34 are promulgated to remove these factors as a cause of mining accidents.

Objections were raised that the requirements for these standards should not be applicable to "nongassy mines" and that fan failure would rarely result in unhealthful air quality in the mine. However, the findings of the Administrative Law Judge supported a contrary conclusion. In some cases where a ventilation fan is down, the air quality is maintained in both "gassy" and "nongassy mines" only as long as the mining equipment is also shut down. The Administrative Law Judge held that if production is continued in such a situation and the equipment continues to operate, hazardous contaminants could build up. New mandatory standards [57.21–21 (continuous operation of main fans), 57.21–24 (fan stoppage), and 57.21–80 (methane monitoring devices)] have also been issued for gassy mines.

Standards 57.5–18D and 57.5–34 do not require the continuous operation of unnecessary main, booster and auxiliary fans. The initial decision as to whether a particular fan is necessary to maintain air quality is left to the mine operator. If the operator determines that a fan is not necessary for maintenance of air quality, it need not be operated. Moreover, fans which are not part of the principal ventilation system or used to maintain air quality are not required to be operated continuously. The standard would not apply to a mine which is naturally ventilated and working efficiently without mechanical ventilation.

The exception in the final rule to the general requirement of continuous fan operation, which permits planned shutdowns where air quality is maintained and all persons underground are advised in advance of the shutdowns, is a revision of the proposed rule and is included in response to public comments. The final standard is directed at MSHA's primary concern—planned or unplanned fan shutdowns that are likely to go unnoticed over a period of time, resulting in the undetected buildup of hazardous contaminants in the working place.

The revised standard, like the proposed standard, establishes procedures to be followed in the event of fan failure, scheduled maintenance, or other fan adjustment. The language has been changed to provide the mine operator with a guide as to what is considered adequate monitoring of air quality. The revised standard requires such monitoring to consist of testing of the air quality at least every 2 hours for compliance with sections 57.5 and 57.21 until normal ventilation is restored.

The Administrative Law Judge rejected the suggestion that contaminant buildups could be avoided when a fan is down by changing the mining cycle or improving the ventilation by opening a new borehole. This was not acceptable because such an alternative could possibly generate more contaminants. A standardized procedure to test air quality or to withdraw mine personnel in instances where a fan becomes unexpectedly inoperative is considered a reasonable and logical precaution against the buildup of contaminants. In this case, preventive measures rather than corrective measures are clearly more appropriate.

The principal concern at the hearing was the 2-hour testing requirement rather than the continuous operation of main, booster and auxiliary fans. Testing is essential and the 2-hour provision will provide operators with specific and uniform direction with respect to the frequency of testing. Instant readouts are available when testing for carbon dioxide, nitrogen dioxide, methane, and other toxic and explosive gases. In these instances, the required testing is simply accomplished and will alert the operator to the presence or absence of these gases; operators will then know whether air quality is being maintained.

57.5–20. Standard 57.5–20 is applicable to underground mines only. It requires the mine operator to prepare a written plan of the mine ventilation system. The plan must be updated at least annually. Upon request of the District Manager, the plan and its revisions must be submitted to MSHA for review and comments. The plan must include a current mine map or schematic, or a series of mine maps or schematics, mine fan data, diagrams or descriptions or sketches showing how ventilation is accomplished and the number and type of internal combustion engine units used underground. The final wording of this standard was stipulated by the parties.

The purposes of this standard are: (1) to insure that each operator of an underground mine routinely plans, reviews and updates the mine's ventilation system; (2) to insure the availability of accurate and current ventilation information; and (3) to provide MSHA with the opportunity to alert the mine operator to potential hazards. In consideration of these purposes, the proposed standard was changed to provide for the submission of plans to the District Manager (upon his written request) for review and comment rather than review and approval. However, MSHA intends to further study the need for a standard involving agency approval of appropriately engineered mine ventilation systems for individual mining oprations.

Comments raised concern about the amount of paperwork required by this standard. However, it is the agency's understanding that much of the information requested is readily available to the operators at this time. Moreover, MSHA's experience has demonstrated that the submission of plans in critical areas such as ventilation provides both the agency and the operator with a valuable tool for assuring uniform and comprehensive protection for miners.

Travelways and Escapeways

57.11–59. Standard 57.11–59, a mandatory standard applicable to underground mines only, requires the mine operator to provide an independent ventilation system for hoist operators who are located underground when these hoists are part of the mine escape and evacuation plan. To provide the hoist operator with a safe means of escape after the hoisting duties are completed, the independent ventilation system must convert to an approved 2 hour self-contained breathing apparatus. The standard specifies two methods, either of which may be used by the mine operator to provide the required ventilation.

In the first method, the mine operator must provide an enclosure type of ventilation system to satisfy this standard. The enclosure type ventilation system can be one that is operated continuously or is capable of immediate activation from within the enclosure during an emergency. Air can be provided for this enclosure system by coursing air: (1) from the surface through metal duct work; (2) through a borehole into the hoist enclosure; or (3) from air compressors located on the surface through metal pipe. A back-up system must be provided for the hoist operator's ventilation system when the method used to provide the air is coursing

surface air through metal duct work or when surface air is coursed from compressors through metal pipe. This back-up system, consisting of compressed air stored in containers connected to the enclosure, must provide and maintain a respirable atmosphere in the enclosure for a period twice as long as is likely to be necessary to evacuate all persons designated to use the hoist identified in the mine escape and evacuation plan.

If the enclosure type ventilation system is not selected, then as an alternative, the mine operator must provide the hoist operator with an approved self-contained breathing apparatus system. This system must consist of a mask connected to compressed air stored in containers adjacent to hoist controls. It must also provide the hoist operator with a minimum of 24 hours of respirable atmosphere. The self-contained system must be capable of connecting quickly with the 2 hour self-contained system that permits the hoist operator's escape.

This standard is promulgated to insure that mine escape and evacuation can be accomplished quickly and efficiently without exposing those participating in escape and evacuation operations to unnecessary hazards. The ventilation system in such mines is crucial to the survival of the miners, including the underground hoist operator. However, due to the nature of the mining environment, the respirable atmosphere is capable of harmful fluctuations, particularly in emergency situations. Therefore, the hoist operator who assists in evacuating miners from hazardous and dangerous mining situations should not be required to rely upon the mine atmosphere to provide the necessary ventilation. The hoist operator is often required to evacuate miners because of abnormal mine atmosphere. The separate and independent ventilation system should eliminate the likelihood of the hoist operator becoming a casualty in such instances. The standard requires a system that is both safe and contains enough air to permit the operator to complete the essential task.

Objection was made to requiring breathing apparatus which would provide a respirable atmosphere for 2 hours. Comments indicated that the provisions necessary to provide a respirable atmosphere vary depending upon the number of persons using the hoist, the location of the hoist in relation to fresh air supplies and the location of the hoist in the mine. MSHA recognizes that each mine differs with respect to ventilation systems, atmosphere and requirements. This standard establishes uniform minimum requirements with an adequate margin of safety, which is critical during emergency situations. Ample respirable air, easily operated equipment, and a conveniently located source of air are essential to preserving the health and safety of miners.

It was further suggested that many hoist operators would not be physically capable of effectively using a 2 hour breathing apparatus, but might qualify for a simpler device. In this regard, MSHA believes that the physical fitness of the hoist operators is critical to both self rescue and the ability to safely evacuate other workers during mine emergencies.

Another comment stated that automatic hoists or self-activated hoists should be excluded from the proposed standard. The revised standard provides needed protection for all hoist operators who must remain at their jobs during mine emergencies. All hoisting equipment used by a hoist operator must be equipped to protect that operator both during the hoisting operation and afterward to provide for that operator's escape.

The final standard establishes alternative methods for providing the hoist operator with an independent respirable atmosphere in a manner most feasible and suitable to particular mine conditions. It is the agency's intention to allow the operator a degree of flexibility in selecting the method that would be most appropriate.

Ventilation for Gassy Mines

57.21–20. This standard is applicable only to underground mines that are classified as "gassy", and is designed to preserve the ventilation system in gassy mines. The standard requires that main fans be powered electrically and be installed: (1) on the surface, (2) in noncombustible housing provided with noncombustible air ducts, (3) 15 feet or more offset from the nearest side of the mine opening where the fan is connected and (4) to permit prompt reversal of airflow. This standard further requires that the fan installations be equipped with explosion-doors or a weak-wall. An automatic signal device must be provided to give a warning or alarm of any fan system malfunction.

Surface installation is required to prevent damage or destruction of the primary ventilation system during a fire or explosion underground. The requirement that main fans be offset is necessary to prevent fan destruction resulting from explosion forces. Explosion-doors or weak-walls are an added safety mechanism to redirect the force of any explosion away from the main fan. Installation of main fans in noncombustible housings, with noncombustible air ducts will prevent destruction in the event of fire.

Electric power is required because it is more efficient and produces less airborne contaminants. Main fans which permit the prompt reversal of air flow are required because they will allow the mine operator to pull contaminated or nonrespirable air away from miners who become trapped underground after a mine explosion. The further requirement of a warning or signal device located where it can be seen or heard by a responsible person is an added safeguard to alert the miners and mine operator of potential air quality problems.

57.21–21. This standard, which is applicable only to underground mines that are classified as "gassy", requires main fans to be operated continuously while persons are underground. The requirement of continuous operation does not apply when main fans are stopped or slowed down for fan maintenance (or fan and system adjustment), provided that the operator complies with the procedural provisions of mandatory standard 75.21–24. Main fans must have pressure-recording gauges which are to be examined daily to determine whether or not they are in good operating condition. The gauge charts are to be changed after completing one revolution. Main fans are to be inspected daily and logs kept of both fan inspections and maintenance. These records are to be retained for 1 year, and made available for inspection by the Secretary or his authorized representative.

57.21–24. Standard 57.21–24 sets out the mandatory procedure to be followed by the operator of a gassy underground mine in the event of fan stoppage.

If a single fan is used in the mine and it stops, or multiple fans are used and they all stop, mine operators are required to immediately withdraw all persons from the affected active workings and to de-energize the power in such workings. All persons must be withdrawn from the mine when there is a 1.0 percent concentration of methane in the air of any active working. All working places and active workings where methane may accumulate must be examined when ventilation has been interrupted for more than 15 minutes. Power is not to be restored or persons permitted to re-enter the active workings until the methane concentration is less than 1.0 percent.

In the event that the mine is one where multiple fans are used and a fan

stoppage occurs, the operator must monitor the air in all active workings for methane content. This provision is applicable when one or more of these fans remains operative and the air flow in the intake and return air courses is maintained. However, when the concentration of methane in the air measures 1.0 percent in such workings, the operator must withdraw all persons and de-energize the power in the active workings.

High levels of methane concentration in the mine air pose both safety and health hazards. Methane, if allowed to accumulate increases the danger of fires, explosions and oxygen deficiency. The concentration of methane in the mine air is minimized by the fans of the mine ventilation system. When these fans are not operating, methane levels tend to increase, particularly if mining continues. Therefore, withdrawing persons from the mine and de-energizing the power is a reasonable safeguard against potential injury caused by excessive accumulations. Where the danger is lessened, as in the situation where air flow in the intake and return air courses is maintained, monitoring is necessary to insure that hazardous accumulations of methane do not go unnoticed.

57.21–80. Standard 57.21–80 establishes a mandatory equipment requirement for methane monitoring in gassy underground mines. This standard requires operators to have a methane monitoring device installed on all continuous miners and longwall face equipment. The device must be approved by the Secretary of Labor and be properly maintained. The sensing unit of the device must be positioned as close to the working face as practicable.

Since methane is actually produced in the mining operations, methane concentrations are likely to be higher at the face and more readily detected there before methane travels to other areas of the mine. The requirements of equipment approval and proper maintenance are to insure that the testing done is accurate enough to serve as a meaningful tool to the operator.

The monitoring device must give a warning when the methane concentration reaches 1.0 percent or more. This requirement will diminish the likelihood of methane concentration levels going unnoticed until the levels reach dangerous proportions.

The monitoring device must also automatically de-energize the equipment to which it is attached when the methane concentration reaches a 1.5 percent level. The likelihood of sparks or electricity causing methane to ignite is thereby lessened. In addition, this requirement reduces the possibility of increasing methane concentration by continuing mining operations.

The language of this standard was stipulated at the hearing. The Secretary of Labor has been substituted for the Secretary of the Interior in the final rule.

Self-Propelled Equipment

55/56/57.9–1. Standards 55/56/57.9–1 are applicable to open pit mines, sand, gravel and crushed stone operations, and surface and underground operations at underground mines. They require the equipment operator to inspect self-propelled equipment that is to be used during a shift before placing the equipment into operation. This inspection should consist of a visual and operational check of the various primary operating systems affecting safety, such as brakes, lights, tires, steering, and related items. Equipment defects affecting safety must be reported to the mine operator either verbally or in writing.

The mine operator must record the defects reported, and retain that record for at least 6 months from the date the defects are recorded. The agency recognizes that mine operators use different types of recording systems, and therefore individual recordkeeping systems will be acceptable to MSHA.

When there is a change of equipment operators on a haul road at the end of a shift or, other times, inspections are not to be made on the haul road but rather at a location which is both convenient and safe.

Haulage Equipment

55/56/57.9–34. Standards 55/56/57.9–34 are applicable to open pit mines, sand, gravel, and crushed stone operations, and surface and underground operations at underground mines.

The standards require haulage equipment to be loaded in a manner to minimize spillage during haulage. The agency recognizes that haulage in the mining environment often results in some spillage of the material being hauled. The standards are directed toward careless loading practices that result in repeated occurrences of excessive spillage.

The proposed standards would have covered the potential overloading of haulage equipment in excess of the manufacturer's rated weight capacity. The provision has been deleted in the final standard. MSHA will undertake further studies and research for the purpose of developing future standards to deal with this problem.

Warning Devices

57.9–104. Standard 57.9–104, which is applicable to underground only, requires warning devices or conspicuous markings to be installed where chute lips, ventilation doors, and obstructions create a hazard to persons on equipment.

Hoisting Buckets

55/56/57.19–78. These standards, which are applicable to open pit mines, sand, gravel and crushed stone operations, and underground mines, provide specific procedures that are to be used when hoisting buckets from shaft bottoms. All buckets are to be stopped after being raised about 3 feet above the bottom of the shaft. Thereafter, buckets are to be stabilized before a hoisting signal is given to continue hoisting the bucket to the crosshead. After this hoisting signal is given, hoisting to the crosshead must be at the minimum speed for the hoist. The signaling device is to be attended constantly until the bucket reaches the guides. When persons are hoisted, the signaling devices are to be attended until the crosshead is engaged.

This standard is intended to be applied during shaft sinking. The use of buckets generally as a means of transporting miners in and out of shafts is unsafe. Buckets must not be used to hoist persons except during shaft sinking, inspection, maintenance, and repair operations [57.19–49]. The object of this standard is to maintain the stability of the bucket when it is raised from the shaft bottom to preclude the bucket from swinging as it is raised. Some variation in the required stopping distance above the shaft bottom may be permitted as long as stabilization of the bucket is achieved.

Sanitary Facilities

55/56/57.20–8. These standards are applicable to all mining and milling operations, and require that toilet facilities be provided at locations which are compatible with the operations and readily accessible to mine personnel. The facilities are to be kept clean and sanitary. Separate toilet facilities are to be provided for each sex, except where toilet rooms will be occupied by no more than one person at a time and can be locked from the inside.

These standards were stipulated by the parties with the understanding that they are an interim measure, and will be the subject of further study by MSHA with the cooperation and assistance of representatives of both labor and mine operators. The purpose of this study will

be to analyze the need, location, and type of sanitary facilities for surface and underground operations. The results of the study will be the basis for a new proposed standard applicable specifically to metal and nonmetal mining and milling operations and conditions.

Drafting Information

The principal persons responsible for drafting this rulemaking document are: Bernard R. McGuire and Patricia G. Tilley, Attorney Advisors, Division of Mine Safety and Health, Office of the Solicitor, Department of Labor; and Herbert P. LeVan, Office of Standards, Regulations and Variances, MSHA.

Regulatory Analysis

It has been determined that this document does not contain a major proposal requiring the preparation of a regulatory analysis under Executive Order No. 12044, or the Department of Labor's final guidelines for implementation of the Executive Order (44 FR 5570, January 26, 1979).

It is estimated that the total cost of compliance with the standards contained in this rule for all metal and nonmetal mines will be approximately 12.6 million dollars during the first year.

Dated: May 29, 1979.

Eckehard Muessig,

Deputy Assistant Secretary for Mine Safety and Health.

PART 55—HEALTH AND SAFETY STANDARDS—METAL AND NONMETALLIC OPEN PIT MINES

Part 55, Subchapter N, Chapter I, Title 30, Code of Federal Regulations is amended and revised as follows:

§ 55.2 [Amended]

A. Section 55.2 "Definitions" is amended as follows:

1. A new definition for the term "Multipurpose dry-chemical fire extinguisher" is added as follows:

"Multipurpose dry-chemical fire extinguisher" means a listed or approved multipurpose dry-chemical fire extinguisher having a minimum rating of 2-A:10-B:C, by Underwriters Laboratories, Inc., and containing a minimum of 4.5 pounds of dry-chemical agent.

(Sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)))

§ 55.9 [Amended]

B. Section 55.9 "Loading, hauling, dumping" is amended as follows:

1. Advisory standard 55.9-1 is revised and made mandatory as follows:

55.9-1 *Mandatory.* Self-propelled equipment that is to be used during a shift shall be inspected by the equipment operator before being placed in operation. Equipment defects affecting safety shall be reported to, and recorded by the mine operator. The records shall be maintained at the mine or nearest mine office for at least 6 months from the date the defects are recorded. Such records shall be made available for inspection by the Secretary of Labor of his duly authorized representative.

2. Advisory standard 55.9-34 is revised and made mandatory as follows:

55.9-34 *Mandatory.* Haulage equipment shall be loaded in a manner to minimize spillage during haulage.

(Sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)))

§ 55.19 [Amended]

C. Section 55.19 "Man hoisting" is amended as follows:

1. Advisory standard 55.19-78 is revised and made mandatory as follows:

55.19-78 *Mandatory.* All buckets shall be stopped after being raised 3 feet above the shaft bottom. A bucket shall be stabilized before a hoisting signal is given to continue hoisting the bucket to the crosshead. After a hoisting signal is given, hoisting to the crosshead shall be at a minimum speed. The signaling device shall be attended constantly until a bucket reaches the guides. When persons are hoisted, the signaling devices shall be attended until the crosshead has been engaged.

(Sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)))

§ 55.20 [Amended]

D. Section 55.20 "Miscellaneous" is revised as follows:

1. Advisory standard 55.20-8 is revised and made mandatory as follows:

55.20-8 *Mandatory.* Toilet facilities shall be provided at locations that are compatible with the mine operations and that are readily accessible to mine personnel. The facilities shall be kept clean and sanitary. Separate toilet facilities shall be provided for each sex except where toilet rooms will be occupied by no more than one person at a time and can be locked from the inside.

(Sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)))

PART 56—HEALTH AND SAFETY STANDARDS— SAND, GRAVEL, AND CRUSHED STONE OPERATIONS

Part 56, Subchapter N, Chapter I, Title 30, Code of Federal Regulations is amended and revised as follows:

§ 56.2 [Amended]

E. Section 56.2 "Definitions" is amended as follows:

1. A new definition for the term "Multipurpose dry-chemical fire extinguisher" is added as follows:

"Multipurpose dry-chemical fire extinguisher" means a listed or approved multipurpose dry-chemical fire extinguisher having a minimum rating of 2-A:10-B:C, by Underwriters Laboratories, Inc., and containing a minimum of 4.5 pounds of dry-chemical agent.

(Sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)).)

§ 56.9 [Amended]

F. Section 56.9 "Loading, hauling, dumping" is amended as follows:

1. Advisory standard 56.9-1 is revised and made mandatory as follows:

56.9-1 *Mandatory.* Self-propelled equipment that is to be used during a shift shall be inspected by the equipment operator before being placed in operation. Equipment defects affecting safety shall be reported to, and recorded by the mine operator. The records shall be maintained at the mine or nearest mine office for at least 6 months from the date the defects are recorded. Such records shall be made available for inspection by the Secretary of Labor or his duly authorized representative.

2. Advisory standard 56.9-34 is revised and made mandatory as follows:

56.9-34 *Mandatory.* Haulage equipment shall be loaded in a manner to minimize spillage during haulage.

(Sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)).)

§ 56.19 [Amended]

G. Section 56.19 "Man hoisting" is amended as follows:

1. Advisory standard 56.19-78 is revised and made mandatory as follows:

56.19-78 *Mandatory.* All buckets shall be stopped after being raised 3 feet above the shaft bottom. A bucket shall be stabilized before a hoisting signal is given to continue hoisting the bucket to the crosshead. After a hoisting signal is given, hoisting to the crosshead shall be at a minimum speed. The signaling device shall be attended constantly until a bucket reaches the guides. When persons are hoisted, the signaling devices shall be attended until the crosshead has been engaged.

(Sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)).)

§ 56.20 [Amended]

H. Section 56.20 "Miscellaneous" is revised as follows:

1. Advisory standard 56.20-8 is revised and made mandatory as follows:

56.20-8 *Mandatory.* Toilet facilities shall be provided at locations that are compatible with the mine operations and that are readily accessible to mine personnel. The facilities shall be kept clean and sanitary. Separate toilet facilities shall be provided for each sex except where toilet rooms will be occupied by no more than one person at a time and can be locked from the inside.

(Sec. 301(c)(3), Pub. L. 95-164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)).)

PART 57—SAFETY AND HEALTH STANDARDS—METAL AND NONMETALLIC UNDERGROUND MINES

Part 57, Subchapter N, Chapter I, Title 30, Code of Federal Regulations is amended and revised as follows:

§ 57.2 [Amended]

I. Section 57.2 "Definitions" is amended as follows:

1. A new definition for the term "Multipurpose dry-chemical fire extinguisher" is added as follows:

"Multipurpose dry-chemical fire extinguisher" means a listed or approved multipurpose dry-chemical fire extinguisher having a minimum rating of 2–A:10–B:C, by Underwriters Laboratories, Inc., and containing a minimum of 4.5 pounds of dry-chemical agent.

(Sec. 301(c)(3), Pub. L. 95–164, 91 Stat. 1318 (30 USC 961(c)(3))

§ 57.4 [Amended]

J. Section 57.4 "Fire prevention and control" is amended as follows:

1. Mandatory standard 57.4–65 is revoked, and standard number 57.4–65 is reserved as follows:

57.4–65 [Reserved]

2. New mandatory standard 57.4–76, which is applicable to underground only, is added as follows:

57.4–76 *Mandatory.* Where welding or cutting with an arc or open flame, or thawing pipes electrically (excluding heat tape) or soldering with an open flame, a multipurpose dry-chemical fire extinguisher shall be provided.

3. New mandatory standard 57.4–77, which is applicable to underground only, is added as follows:

57.4–77 *Mandatory.* Where welding or cutting with an arc or open flame, or thawing pipes electrically (excluding heat tape) within thirty five (35) feet, or where soldering with an open flame within ten (10) feet, of more than one (1) gallon of combustible liquid (unless the combustible liquid is in a closed noncombustible metal container) or more than fifty (50) pounds of non fire retardant wood, or more than ten (10) pounds of combustible plastic, the following precautions, in addition to a multipurpose dry-chemical fire extinguisher shall be taken:

(a) A second multipurpose dry-chemical fire extinguisher, or fire extinguishing equipment having equivalent extinguishing capability and appropriate for the particular hazard involved, shall be provided.

(b) The combustible materials and the area between them and the operation shall be wetted down (precautions shall be taken against electrical shock, where necessary) before and after the operation. If wetting down is not practical, then the combustibles shall be isolated by noncombustible material or the operation shall be shielded to insure that smoldering metal or sparks to not result in a fire.

(c) If the precautions in (b) are not practical, then a second person shall be present to observe and extinghish fires.

(d) Inspection(s) of the affected areas shall be made during the first hour after the operation is terminated. If the mine operator deems that working conditions and the degree of potential hazard warrant it, additional inspections shall be made or other extra-precautionary measures shall be taken.

4. New mandatory standard 57.4–78, which is applicable to underground only, is added as follows:

57.4–78 *Mandatory.* Where welding or cutting with an arc or open flame, or thawing pipes electrically (excluding heat tape) in or within thirty-five (35) feet, or where soldering with an open flame in or within ten (10) feet, of a shaft, raise, or winze and where there is a risk that combustible materials may be ignited by falling sparks or heated material, the following precautions, in addition to a multipurpose dry-chemical fire extinguisher, shall be taken;

(a) A second multipurpose dry-chemical fire extinguisher, or fire extinguishing equipment having equivalent extinguishing capability and appropriate for the particular hazard involved, shall be provided.

(b) The combustible materials and the area between them and the operation shall be wetted down (precautions shall be taken against electrical shock, where necessary) before and after the operation. If wetting down is not practical, then the combustibles shall be isolated by noncombustible material or the operation shall be shielded to insure that smoldering metal or sparks do not result in a fire.

(c) Or, if practical, the opening immediately below or adjacent to the operation shall be covered or bulkheaded with a noncombustible material.

(d) If the precautions in (b) or (c) are not practical, then a second person shall be present to observe and extinguish fires.

(e) Inspection(s) of the affected area shall be made during the first hour after the operation is terminated. If the mine operator deems that working conditions and the degree of potential hazard warrant it, additional inspections shall be made or other extra-precautionary measures shall be taken.

(Sec. 301(c)(3), Pub. L. 95–164, 91 Stat. 1318 (30 U.S.C. 961(c)(3))

§ 57.5 [Amended]

K. Section 57.5 "Air quality, ventilation, radiation, and physical agents" is amended as follows:

1. New mandatory standard 57.5–18B, which is applicable to surface and underground is added to read as follows:

57.5–18B *Mandatory.* Areas within twenty-five (25) feet of main and booster fans shall be kept free of combustible materials except for installed wiring, materials used for fan maintenance, direct fired heaters, and materials used for ground support.

2. New mandatory standard 57.5–18D, which is applicable to surface and underground, is added to read as follows:

57.5–18D *Mandatory.* (a) All mine main and booster fans installed and used to ventilate the active workings of the mine shall be operated continuously while persons are underground in the active workings. However, this provision is not applicable during scheduled production-cycle shutdowns or planned or scheduled fan maintenance or fan adjustments where air quality is maintained in compliance with the applicable standards of section 57.5 and all persons underground in the affected areas are advised in advance of such scheduled or planned fan shutdowns, maintenance, or adjustments.

(b) In the event of main or booster fan failure due to a malfunction, accident, power failure, or other such unplanned or unscheduled event:

(1) The air quality in the affected active workings shall be tested at least within 2-hours of the discovery of the fan failure, and at least every 4-hours thereafter by a competent person for compliance with the requirements of the applicable standards of section 57.5 until normal ventilation is restored, or

(2) All persons, except those working on the fan, shall be withdrawn, the ventilation shall be restored to normal and the air quality in the affected active workings shall be tested by a competent person to assure that the air quality meets the requirements of the standards in Section 57.5, before any other persons are permitted to enter the affected active workings.

3. New mandatory standard 57.5–20, which is applicable to underground only, is added as follows:

57.5–20 *Mandatory.* A plan of the mine ventilation system shall be set out by the operator in written form. Revisions of the system shall be noted and updated at least annually. The ventilation plan or revisions thereto shall be submitted to the District Manager for review and comments upon his written request. The plan shall, where applicable, contain the following:

(a) The mine name

(b) The current mine map or schematic or series of mine maps or schematics of an appropriate scale, not greater than five hundred (500) feet to the inch, showing

(1) Direction and quantity of principal air flows;

(2) Locations of seals used to isolate abandoned workings;

(3) Locations of areas withdrawn from the ventilation system;

(4) Locations of all main, booster and auxiliary fans not shown in subsection (d) of this standard;

(5) Locations of air regulators and stoppings and ventilation doors not shown in subsection (d) of this standard;

(6) Locations of overcasts, undercasts and other airway crossover devices not shown in subsection (d) of this standard;

(7) Locations of known oil or gas wells;

(8) Locations of known underground mine openings adjacent to the mine;

(9) Locations of permanent underground shops, diesel fuel storage depots, oil fuel storage depots, hoist rooms, compressors, battery charging stations and explosive storage facilities. Permanent facilities are those intended to exist for one year or more;

(10) Significant changes in the ventilation system projected for one year.

(c) Mine fan data for all active main and booster fans including manufacturer's name, type, size, fan speed, blade setting, approximate pressure at present operating point, and motor brake horsepower rating.

(d) Diagrams, descriptions or sketches showing how ventilation is accomplished in each typical type of working place including the approximate quantity of air provided, and typical size and type of auxiliary fans used.

(e) The number and type of internal combustion engine units used underground, including make and model of unit, type of engine, make and model of engine, brake horsepower rating of engine, and approval number.

4. New mandatory standard 57.5–34, which is applicable to underground only, is added to read as follows:

57.5–34 *Mandatory.* (a) Auxiliary fans installed and used to ventilate the active workings of the mine shall be operated continuously while persons are underground in the active workings, *except* for scheduled production-cycle shutdowns or planned or scheduled fan maintenance or fan adjustments where air quality is maintained in compliance with the applicable standards of Section 57.5, and all persons underground in the affected areas are advised in advance of such scheduled or planned fan shutdowns, maintenance, or adjustments.

(b) In the event of auxiliary fan failure due to malfunction, accident, power failure, or other such unplanned or unscheduled event:

(1) The air quality in the affected active workings shall be tested at least within 2-hours of the discovery of the fan failure, and at least every 4-hours thereafter by a competent person for compliance with the requirements of the applicable standards of section 57.5 until normal ventilation is restored, or

(2) All persons, except those working on the fan, shall be withdrawn, the ventilation shall be restored to normal and the air quality in the affected active workings shall be tested by a competent person to assure that the air quality meets the requirements of the standards in Section 57.5, before any other persons are permitted to enter the affected active workings.

5. Mandatory standard 57.5–37, which is applicable to underground only, is revised as follows:

57.5–37 *Mandatory.* (a) In all mines at least one sample shall be taken in exhaust mine air by a competent person to determine if concentrations of radon daughters are present. Sampling shall be done using suggested equipment and procedures described in section 14.3 of ANSI N13.8–1973, entitled "American National Standard Radiation Protection in Uranium Mines," approved July 18, 1973, pages 13–15, by the American National Standards Institute, Inc., which is incorporated by reference and made a part of the standard [1] or equivalent procedures and equipment acceptable to the Administrator, Metal and Nonmetal Mine Safety and Health, Mine Safety and Health Administration. This publication may be examined at any Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration, or may be obtained from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018. The mine operator may request that the required exhaust mine air sampling be done by the Mine Safety and Health Administration. If concentrations of radon daughters in excess of 0.1 WL are found in an exhaust air sample, thereafter—

(1) Where uranium is mined—radon daughter concentrations representative of worker's breathing zone shall be determined at least every two weeks at random times in all active working areas such as stopes, drift headings, travelways, haulageways, shops, stations, lunch rooms, magazines, and any other place or location where persons work, travel, or congregate. However, if concentrations of radon daughters are found in excess of 0.3 WL in an active working area, radon daughter concentrations thereafter shall be determined weekly in that working area until such time as the weekly determinations in that area have been 0.3 WL or less for 5 consecutive weeks.

(2) Where uranium is not mined—when radon daughter concentrations between 0.1 and 0.3 WL are found in an active working area, radon daughter concentration measurements representative of worker's breathing zone shall be determined at least every 3 months at random times until such time as the radon daughter concentrations in that area are below 0.1 WL, and annually thereafter. If concentrations of radon daughters are found in excess of 0.3 WL in an active working area radon daughter concentrations thereafter shall be determined at least weekly in that working area until such time as the weekly determinations in that area have been 0.3 WL or less for 5 consecutive weeks.

(b) If concentrations of radon daughters less than 0.1 WL are found in an exhaust mine air sample, therefore;

(1) Where uranium is mined—at least one sample shall be taken in the exhaust mine air monthly.

(2) Where uranium is not mined—no further exhaust mine air sampling is required.

(c) The sample date, locations, and results obtained under (a) and (b) above shall be recorded and retained at the mine site or nearest mine office for at least two (2) years and shall be made available for inspection by the Secretary or his authorized representative.

[1] Incorporation by reference provisions approved by Director of the Federal Register, September 23, 1975.

6. Mandatory standard 57.5–40, which is applicable to undergound only, is revised as follows:

57.5–40 *Mandatory.* (a) The operator shall calculate and record complete individual exposures to concentrations of radon daughters as follows:

(1) Where uranium is mined—the complete individual exposures of all mine personnel working underground shall be calculated and recorded. These records shall include the individual's time in each active working area such as stopes, drift headings, travelways, haulageways, shops, stations, lunch rooms, magazines and any other place or location where persons work, travel or congregate, and the concentration of airborne radon daughters for each active working area.

(2) Where uranium is not mined—the complete individual exposure of all mine personnel working in active working areas with radon daughter concentrations in excess of 0.3 WL shall be calculated and recorded. These records shall include the individual's time in each active working area and the concentrations of airborne radon daughters for each active working area. The operator may discontinue calculating and recording the individual exposures of any personnel assigned to work in active working areas where radon daughter concentrations have been reduced to 0.3 WL or less for 5 consecutive weeks provided that such exposure calculation and recordation shall not be discontinued with respect to any person who has accumulated more exposure than 1/12 (one-twelfth) of a WLM times the number of months for which exposures have been calculated and recorded in the calendar year in which the exposure calculation and recordation is proposed to be discontinued.

(b) The operator shall maintain the form entitled "Record of Individual Exposure to Radon Daughters" (Form 4000–9), or equivalent forms that are acceptable to the Administrator, Metal and Nonmetal Mine Safety and Health, Mine Safety and Health Administration, on which there shall be recorded the specific information required by the form with respect to each person's time-weighted current and cumulative exposure to concentrations of radon daughters.

(1) The form entitled "Record of Individual Exposure to Radon Daughters" (Form 4000–9), shall consist of an original of each form for the operator's records which shall be available for examination by the Secretary or his authorized representative.

(2) On or before February 15 of each calendar year, or within 45 days after the shut-down of mining operations for the calendar year, each mine operator shall submit to the Mine Safety and Health Administration a copy of the "Record of Individual Exposure to Radon Daughters" (Form 4000–9), or acceptable equivalent form, showing the data required by the form for all personnel for whom calculation and recording of exposure was required during the previous calendar year.

(3) Errors detected by the operator shall be corrected on any forms kept by the operator and a corrected copy of any forms submitted to the Mine Safety and Health Administration

shall be submitted to the Mine Safety and Health Administration within 60 days of detection and shall identify the errors and indicate the date the corrections are made.

(4) The operator's records of individual exposure to concentrations of radon daughters and copies of "Record of Individual Exposure to Radon Daughters" (Form 4000–9) or acceptable equivalent form or true legible facsimiles thereof (microfilm or other), shall be retained at the mine or nearest mine office for a period as specified in paragraph 9.8, ANSI N13.8–1973, or shall be submitted to the Mine Safety and Health Administration. These records, if retained by the operator, shall be open for inspection by the Secretary of Labor, his authorized representative, and authorized representatives of the official mine inspection agency of the State in which the mine is located. Paragraph 9.8, ANSI N13.8–1973, is incorporated by reference and made a part of this standard.[2] ANSI N13.8–1973, may be examined at any Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration, and may be obtained from the American National Standards Institute, Inc., at 1430 Broadway, New York, New York 10018.

(5) Upon written request from a person who is a subject of these records, a statement of the year-to-date and cumulative exposure applicable to that person shall be provided to the person or to whomever such person designates.

(6) The blank form entitled "Record of Individual Exposure to Radon Daughters" (Form 4000–9) may be obtained on request from any Metal and Nonmetal Mine Safety and Health Subdistrict Office of the Mine Safety and Health Administration.

Note.—To calculate an individual's exposure to WLM for a given period of time, multiply the total exposure time (hours to the nearest half-hour) in an active working area by the average concentration of airborne radon daughters for the applicable active working area (average working level calculated to the nearest hundredth working level) and divide the product by the constant 173 hours per month.

An average airborne radon daughter concentration for a designated active working area shall be determined by averaging all sampling results for that working area during the time that persons are present. Any sample taken by Federal or State mine inspectors, which represents exposure to miners and reported to the operator within three (3) days of being taken, shall be included in the average concentration; except that if the mine operator samples simultaneously with the inspector, he may use his own sample results.

(Sec. 301(c)(3), Pub. L. 95–164, 91 Stat. 1318 (30 U.S.C. 961(c)(3))

§ 57.9 [Amended]

L. Section 57.9 "Loading, hauling, dumping" is amended as follows:

1. Advisory standard 57.9–1, which is applicable to surface and underground, is revised and made mandatory as follows:

57.9–1 *Mandatory.* Self-propelled equipment that is to be used during a shift shall be inspected by the equipment operator before being placed in operation. Equipment defects affecting safety shall be reported to, and recorded by the mine operator. The records shall be maintained at the mine or nearest mine office for at least 6 months from the date the defects are recorded. Such records shall be made available for inspection by the Secretary of Labor or his duly authorized representative.

2. Advisory standard 57.9–34, which is applicable to surface and underground, is revised and made mandatory as follows:

57.9–34 *Mandatory.* Haulage equipment shall be loaded in a manner to minimize spillage during haulage.

3. Advisory standard 57.9–104, which is applicable to underground only, is revised and made mandatory as follows:

57.9–104 *Mandatory.* Warning devices or conspicuous markings shall be installed where chute lips, ventilation doors, and obstructions create a hazard to persons on equipment.

(Sec. 301(c)(3), Pub. L. 95–164, 91 Stat. 1318 (30 U.S.C. 961(c)(3))

§ 57.11 [Amended]

M. Section 57.11 "Travelways and escapeways" is amended as follows:

1. New mandatory standard 57.11–59, which is applicable to underground only, is added as follows:

57.11–59 *Mandatory.* For the protection of operators of hoists located underground which are part of the mine escape and evacuation plan required under standard 57.11–53, the hoist operator shall be provided with a respirable atmosphere completely independent of the mine atmosphere. This independent ventilation system shall convert, without contamination, to an approved and properly maintained 2-hour self-contained breathing apparatus to provide a safe means of escape for the hoist operator after the hoisting duties have been completed as prescribed in the mine escape and evacuation plan for that hoist. The hoist operator's independent ventilation system shall be provided by one of the following methods:

(a) A suitable enclosure equipped with a positive pressure ventilation system which may be operated continuously or be capable of immediate activation from within the enclosure during an emergency evacuation. Air for the enclosure's ventilation system shall be provided in one of the following ways—

(1) Air coursed from the surface through a borehole into the hoist enclosure directly or through a metal pipeline from such borehole: or

(2) Air coursed from the surface through metal duct work into the hoist enclosure, although this duct work shall not be located in timber-supported active workings; or

(3) Air supplied by air compressors located on the surface and coursed through metal pipe into the hoist enclosure.

A back-up system shall be provided for a hoist enclosure ventilation system provided by either of the methods set forth in (a)(2) and (a)(3) above. This back-up system shall consist of compressed air stored in containers connected to the enclosure. This back-up system shall provide and maintain a respirable atmosphere in the enclosure for a period of time equal to at least twice the time necessary to complete the evacuation of all persons designated to use that hoist as prescribed in the mine escape and evacuation plan required under standard 57.11–53; or

(b) An approved and properly maintained self-contained breathing apparatus system which shall consist of a mask connected to compressed air stored in containers adjacent to the hoist controls. The self-contained breathing system shall provide a minimum of 24 hours of respirable atmosphere to the hoist operator. In addition, the self-contained breathing system shall be capable of a quick connect with the approved 2-hour self-contained breathing apparatus above.

(Sec. 301(c)(3), Pub. L. 95–164, 91 Stat. 1318 (30 U.S.C. 961(c)(3))

§ 57.19 [Amended]

N. Section 57.19 "Man hoisting" is amended as follows:

1. Advisory standard 57.19–78 is revised and made mandatory as follows:

57.19–78 *Mandatory.* All buckets shall be stopped after being raised about three (3) feet above the shaft bottom. A bucket shall be stabilized before a hoisting signal is given to continue hoisting the bucket to the crosshead. After a hoisting signal is given, hoisting to the crosshead shall be at a minimum speed. The signaling device shall be attended constantly until a bucket reaches the guides. When persons are hoisted, the signaling devices shall be attended until the crosshead has been engaged.

(Sec. 301(c)(3), Pub. L. 95–164, 91 Stat. 1318 (30 U.S.C. 961(c)(3)).)

§ 57.20 [Amended]

O. Section 57.20 is amended as follows:

1. Advisory standard 57.20–8, which is applicable to surface and underground, is revised and made mandatory as follows:

57.20–8 *Mandatory.* (a) Toilet facilities shall be provided at locations that are compatible with the mine operations and that are readily accessible to mine personnel.

(b) The facilities shall be kept clean and sanitary. Separate toilet facilities shall be provided for each sex except where toilet rooms will be occupied by no more than one person at a time and can be locked from the inside.

(Sec. 301(c)(3), Pub. L. 95–164, 91 Stat. 1318 (30 U.S.C. 961(c)(3))

[2] Incorporation by reference provisions approved by Director of the Federal Register September 23, 1975.

§ 57.21 [Amended]

P. Section 57.21 "Gassy mines" is amended as follows:

1. Mandatory standard 57.21–20 is revised as follows:

57.21–20 *Mandatory.* Main fans shall be:

(a) Installed on the surface.

(b) Installed to permit prompt reversal of airflow.

(c) Powered electrically.

(d) Installed in noncombustible housing provided with noncombustible air ducts.

(e) Offset not less than 15 feet from the nearest side of the mine opening to which the fan is connected. The fan installation shall be equipped with explosion-doors or a weak-wall having an area at least equivalent to the cross-sectional area of the airway. Such doors or weak-wall shall be in direct line with possible explosion forces.

(f) Provided with an automatic signal device to give warning or alarm should the fan system malfunction. The signal device shall be so located that it can be seen or heard by a responsible person at all times when persons are underground.

2. Advisory standard 57.21–21 is revised and made mandatory as follows:

57.21–21 *Mandatory.* Main fans shall be:

(a) Operated continuously while persons are underground except when stopped or slowed down for fan maintenance and/or fan adjustments and related ventilation system adjustments and compliance is made with the provisions of mandatory standard 57.21–24.

(b) Provided with pressure-recording gages which shall be examined daily for good operating condition. The charts of such gages shall be changed after completing one revolution.

(c) Inspected daily and logs kept of such inspections and of fan maintenance. Charts and logs shall be retained for a minimum of one year. Such records and charts shall be available for inspection by the Secretary or his duly authorized representative.

3. Mandatory standard 57.21–24 is revised to read as follows:

57.21–24 *Mandatory.* (a) At mines where a single main fan is used and such fan stops, or at mines where multiple main fans are used and all such fans stop, the operator shall take the following immediate action:

(1) Withdraw all persons from the affected active workings.

(2) Deenergize the power in affected active workings.

(3) Withdraw all persons from the mine when a 1.0 percent concentration of methane in air is measured in any active working.

If ventilation has been interrupted for more than 15 minutes, all working places and active workings where methane may accumulate shall be examined by a competent person(s). The power shall not be restored or persons permitted to reenter the affected active workings until the competent person(s) has determined the methane concentration in such active workings is less than 1.0 percent.

(b) At mines where multiple main fans are used and one or more but not all fans stop, and air flow in intake and return air courses is maintained, the operator shall take the following immediate action:

(1) Monitor the air in all active workings for methane content.

(2) Withdraw all persons from, and de-energize the power, in all active workings when a 1.0 percent concentration of methane in the air is measured.

(3) Comply with all related mandatory standards in section 57.21.

4. New mandatory standard 57.21–80 is added as follows:

57.21–80 *Mandatory.* A methane monitoring device (methane monitor), approved by the Secretary of Labor, shall be installed and properly maintained on all continuous miners and longwall face equipment. The sensing unit of methane monitor shall be positioned as close to the working face as practicable. When the concentration of methane is 1.0 percent or more, the monitor shall give a warning and deenergize the equipment automatically when the concentration reaches 1.5 percent. The methane monitor also shall de-energize such equipment automatically when the monitor is not functioning properly.

(Sec. 301(c)(3), Pub. L. 95–164, 91 Stat. 1318 (30 U.S.C. 961(c)(3))

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